

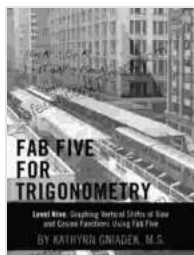
Mastering Vertical Shifts of Sine and Cosine Functions with the Ingenious Fab Five

Horizontal Shift	Vertical Shift
Inside the function $y = (x+3)^2$ $y = \sin(x+3)$ $y = x+3 ^2$	Outside the function $y = x^2 + 3$ $y = \sin(x) + 3$ $y = x + 3$
Direction is opposite to sign $+$ \implies $-X$ $-$ \implies $+X$	Direction is same as sign $+$ \implies $+y$ $-$ \implies $-y$
Divided by x-coefficient $y = \sin(2x+3) \implies$ H-Shift $-\frac{3}{2}$ $y = \sqrt{5x-10} \implies$ H-Shift $+2$	Ignores x-coefficient $y = \sin(2x)+3 \implies$ V-Shift $+3$ $y = \sqrt{5x-10} \implies$ V-Shift -10

Sine and cosine functions are the cornerstones of trigonometry, and graphing them accurately is essential for success in various mathematical disciplines. However, vertical shifts can pose a challenge, especially for beginners. Enter the Fab Five, an innovative method that simplifies this process, making it both efficient and enjoyable.

Meet the Fab Five

The Fab Five is a set of five rules that govern the vertical shifts of sine and cosine functions:



Fab Five for Trigonometry Level Nine: Graphing Vertical Shifts of Sine and Cosine Functions Using Fab Five

by Achim Klenke

★★★★★ 5 out of 5

Language	: English
File size	: 785 KB
Text-to-Speech	: Enabled
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Enhanced typesetting	: Enabled
Word Wise	: Enabled
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Lending	: Enabled
X-Ray for textbooks	: Enabled
Hardcover	: 380 pages
Item Weight	: 3.51 pounds
Dimensions	: 6.14 x 0.88 x 9.21 inches



1. **Up 1: $y = \sin(x) + 1$**
2. **Down 1: $y = \sin(x) - 1$**
3. **Up 2: $y = \cos(x) + 2$**
4. **Down 2: $y = \cos(x) - 2$**
5. **No Shift: $y = \sin(x)$ or $y = \cos(x)$**

How to Use the Fab Five

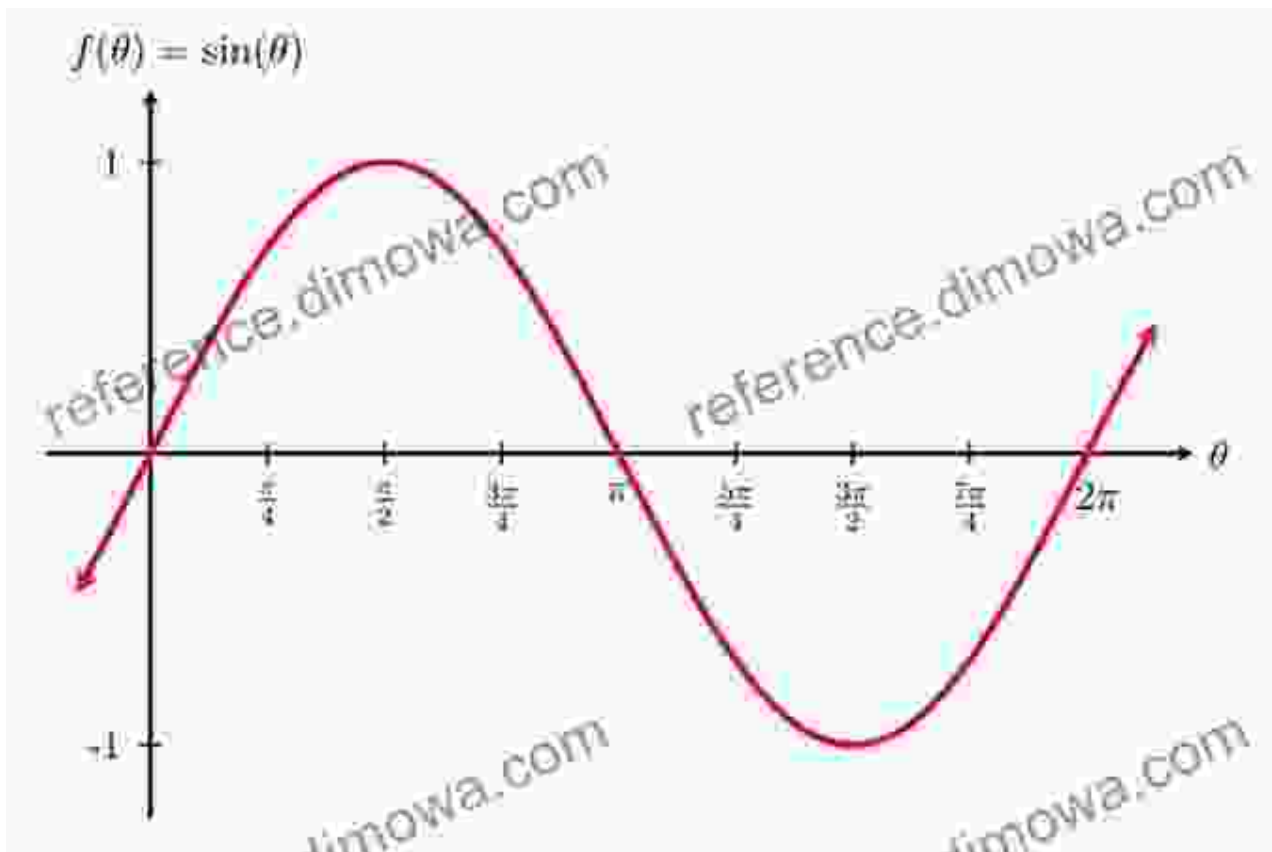
Applying the Fab Five to graph vertical shifts is straightforward:

1. Identify the function type (sine or cosine).
2. Determine the direction of the shift (up or down).
3. Refer to the Fab Five table to find the corresponding rule.
4. Apply the rule to the original function.
5. Graph the shifted function.

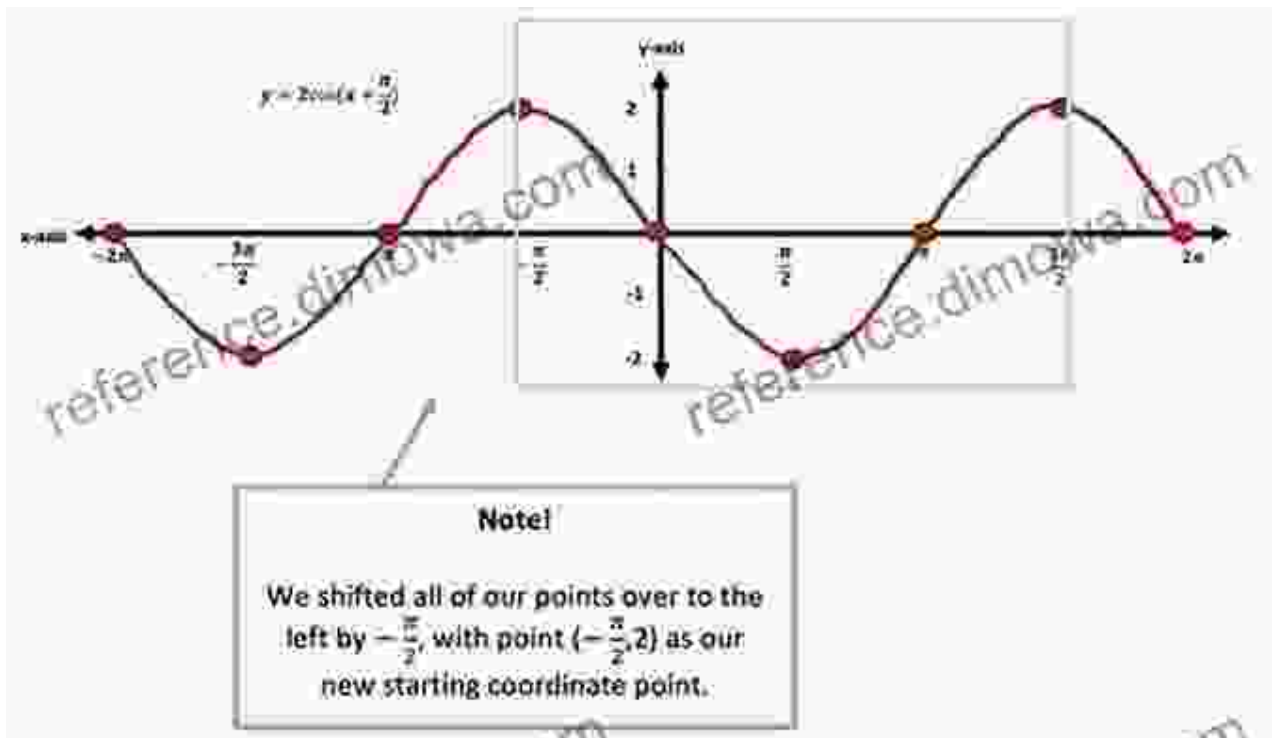
Visualizing the Shifts

To aid in understanding, let's visualize the shifts using a sine function:

- **$y = \sin(x) + 1$** : The graph shifts 1 unit up.



- **$y = \sin(x) - 1$** : The graph shifts 1 unit down.



Practice Problems

Let's test your understanding with some practice problems:

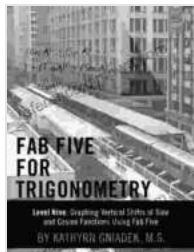
1. Graph $y = \cos(x) + 2$.
2. Find the equation of the cosine function that is shifted 1 unit down.
3. Determine the vertical shift of $y = \sin(x) - 1$.

Additional Tips

- Remember that the Fab Five only applies to vertical shifts.
- Use a graphing calculator or online tool to verify your graphs.
- Practice regularly to improve your accuracy and efficiency.

The Fab Five is an invaluable tool for graphing vertical shifts of sine and cosine functions. By embracing this method, you can simplify this

mathematical concept, enhance your understanding, and boost your confidence in trigonometry. So, embrace the Fab Five and conquer vertical shifts with ease!

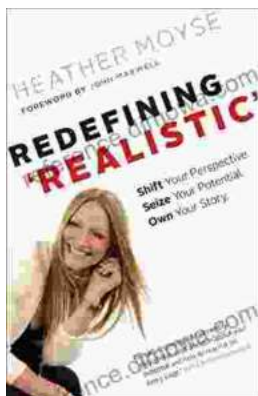


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